

SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

Product Identifier

SRM Number: 2972
SRM Name: 25-Hydroxyvitamin D₂ and D₃ Calibration Solutions
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is intended primarily for use in calibration of instruments and techniques used for the determination of these metabolites. SRM 2972 consists of two separate solutions of vitamin D metabolites 25-hydroxyvitamin D₂ and 25-hydroxyvitamin D₃ in ethanol. A unit of SRM 2972 consists of ten 2 mL ampoules, five of which contain approximately 1.2 mL of the 25-hydroxyvitamin D₂ solution and five of which contain approximately 1.2 mL of the 25-hydroxyvitamin D₃ solution.

Company Information

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2300
Gaithersburg, Maryland 20899-2300

Telephone: 301-975-2200
FAX: 301-948-3730
E-mail: SRMMSDS@nist.gov
Website: <http://www.nist.gov/srm>

Emergency Telephone ChemTrec:
1-800-424-9300 (North America)
+1-703-527-3887 (International)

2. HAZARDS IDENTIFICATION

Classification

Physical Hazard: Flammable Liquid, Category 2
Health Hazard: Not classified.

Label Elements

Symbol



Signal Word

Danger

Hazard Statement(s)

H225 Highly flammable liquid and vapor.

Precautionary Statement(s)

P210 Keep away from heat/sparks/open flames/hot surfaces. — No smoking.
P233 Keep container tightly closed.
P241 Use explosion-proof electrical/ventilating/lighting equipment.
P240 Ground/Bond container and receiving equipment.
P242 Use non-sparking tools.
P243 Take precautionary measures against static discharge.
P280 Wear protective gloves/eye protection/protective clothing.
P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P370+P378 In case of fire: use regular dry chemical, carbon dioxide, water, or alcohol-resistant foam.
P403+P235 Store in a well-ventilated place. Keep cool.

P501 Dispose of contents/container in accordance with local/regional/national/international programs.

Hazards Not Otherwise Classified: None.

Ingredients(s) with Unknown Acute Toxicity: None.

3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Substance: Vitamin D metabolites in ethanol.

Other Designations: Ethanol (Ethyl alcohol; grain alcohol; ethyl hydroxide; ethyl hydrate; algrain; methyl carbinol; cologne spirits; fermentation alcohol; absolute alcohol; C₂H₅OH).

The solutions contain small amounts of 25-hydroxyvitamin D₂ and 25-hydroxyvitamin D₃, which both have suspected toxicity; therefore, care should be exercised during handling and use. Components listed below are in compliance with OSHA's 29 CFR 1910.1200; see the Certificate of Analysis for actual values.

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Ethanol	64-17-5	200-578-6	99.9

4. FIRST AID MEASURES

Description of First Aid Measures:

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration or oxygen by qualified personnel. Seek immediate medical attention.

Skin Contact: Rinse affected area with soap and water for at least 15 minutes. Seek medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids with copious amounts of water for at least 15 minutes. Seek immediate medical attention.

Ingestion: Contact a poison control center immediately for instructions. Give water to rinse out mouth. Never give liquids to a person with reduced awareness or becoming unconscious. If vomiting occurs, keep head lower than hips to prevent aspiration. If not breathing, give artificial respiration by qualified personnel. Seek immediate medical attention.

Most Important Symptoms/Effects, Acute and Delayed: Respiratory tract irritation, skin irritation, eye irritation, liver damage, and central nervous system depression.

Indication of any immediate medical attention and special treatment needed, if necessary: If any of the above symptoms are present, seek immediate medical attention.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Severe fire hazard. Vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. Vapor/air mixtures are explosive above flash point. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media:

Suitable: Regular dry chemical, carbon dioxide, fine water spray, and alcohol resistant foam.

Unsuitable: None listed.

Specific Hazards Arising from the Chemical: Thermal decomposition will form oxides of carbon.

Special Protective Equipment and Precautions for Fire-Fighters: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA).

NFPA Ratings (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 2

Fire = 3

Reactivity = 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures: Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

Methods and Materials for Containment and Clean up: Do not touch spilled material. Notify safety personnel of spills. Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Isolate hazard area and deny entry.

7. HANDLING AND STORAGE

Safe Handling Precautions: See Section 8, “Exposure Controls and Personal Protection”. Handle glass ampoules with care.

Storage: Store and handling in accordance with all current regulations and standards. Sealed ampoules, as received, should be stored in the dark at temperatures $\leq -20^{\circ}\text{C}$. Keep separated from incompatible substances.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits:

OSHA (PEL):	1000 ppm TWA or 1900 mg/m ³ TWA
ACGIH (TLV):	1000 ppm STEL
NIOSH (REL):	1000 ppm TWA or 1900 mg/m ³ TWA 3300 ppm IDLH (10 % LEL)

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye/Face Protection: Wear splash resistant safety goggles with a face shield. An eye wash station should be readily available near areas of use.

Skin and Body Protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

NOTE: The physical and chemical data provided are for ethanol. No physical or chemical data are available for the 25-hydroxyvitamin D2 and D3 solutions.

Descriptive Properties:

	Ethanol
Appearance (physical state, color, etc.):	colorless liquid
Molecular Formula:	C ₂ H ₅ OH
Molar Mass (g/mol):	46.07
Odor:	vinous
Odor threshold:	5 ppm to 10 ppm
pH:	not available
Evaporation rate (CCl₄ = 1):	1.4
Melting point/freezing point (°C):	-117 (-179 °F)
Density (g/mL):	0.78775 at 20 °C
Specific Gravity (water = 1):	0.7893
Vapor Pressure (mmHg):	40 at 19 °C
Vapor Density (air = 1):	1.59
Viscosity (cP):	1.22 to 1.41 at 20 °C
Solubility(ies):	benzene, ether, acetone, chloroform, organic solvents
Partition coefficient (n-octanol/water):	not available
Particle Size (if relevant):	not applicable

Thermal Stability Properties:	Ethanol
Autoignition Temperature (°C):	363 (685 °F)
Thermal Decomposition (°C):	not applicable
Initial boiling point and boiling range (°C):	78.3 to 78.5 (173 °F)
Explosive Limits, LEL (Volume %):	3.3
Explosive Limits, UEL (Volume %):	19
Flash Point (°C):	13 °C (TCC)
Flammability (solid, gas):	not applicable

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal temperatures and pressure.

Stability: X Stable Unstable

Possible Hazardous Reactions: None listed.

Conditions to Avoid: Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.

Incompatible Materials: Acids, bases, combustible materials, halo carbons, halogens, metal oxides, metal salts, metals, oxidizing materials, peroxides.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Thermal decomposition will produce oxides of carbon.

Hazardous Polymerization: Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: X Inhalation X Skin X Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: Respiratory tract irritation, skin irritation, eye irritation, narcosis.

Potential Health Effects (Acute, Chronic and Delayed):

Inhalation: Ethanol may cause irritation of mucous membranes, headache, drowsiness, fatigue, nervousness, dullness, narcosis, lack of concentration, somnolence, and symptoms of drunkenness. Reproductive effects have been reported in animals.

Skin Contact: Ethanol may cause irritation, mild redness and burning, sensitization, allergic, contact dermatitis. Chronic exposure to ethanol may result in defatting of the skin.

Eye Contact: Ethanol may cause irritation, conjunctivitis, and corneal cloudiness. Vapors exposure at sufficiently high concentrations may cause stinging and watering of the eye.

Ingestion: Ethanol short term exposure may cause headache, drowsiness, emotional lability, decreased inhibitions, exhilaration, boastfulness, talkativeness, remorse, belligerency, gradual visual impairment, muscular incoordination, slurring of speech, and symptoms of drunkenness; long term exposure may result in liver damage. Reproductive effects have been reported in animals.

Numerical Measures of Toxicity:

Acute Toxicity: Not classified.

Ethanol, Rat, Oral LD50: 7060 mg/kg

Rat, Inhalation LC50: 124.7 mg/L (4 h)

Skin Corrosion/Irritation: Not classified.

Ethanol, Rabbit skin, moderate: 20 mg (24 h)

Human skin: 70 %

Serious Eye damage/Eye irritation: Not classified.

Ethanol, Rabbit eyes, mild: 500 mg (24 h)

Rabbit eyes, severe: 500 mg

Respiratory Sensitization: No data available.

Skin Sensitization: No data available.

Germ Cell Mutagenicity: Not classified.

Ethanol, Human: 15 mmol/L (24 h), 100 mmol/L (3 h)

Carcinogenicity: Not classified, this SRM is not for human consumption.

Listed as a Carcinogen/Potential Carcinogen _____ Yes X No
IARC lists ethanol (as related to alcoholic beverages) as Group 1 (carcinogenic to humans).

Reproductive Toxicity: Not classified.

Ethanol, Rat, Oral TDLo: 112 mg/kg (14 d)

Human, Oral TDLo (37 weeks pregnant): 250 mg/kg

Specific Target Organ Toxicity, Single Exposure: Not classified.

Specific Target Organ Toxicity, Repeated Exposure: Not classified.

Aspiration Hazard: No data available.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data:

Fish: Rainbow trout (*Oncorhynchus mykiss*) LC50 (static): 12.0 mg/L to 16.0 mL/L (96 h)

Fathead minnow (*Pimephales promelas*) LC50 (static): >100 mg/L (96 h)

Invertebrate: Freshwater water flea (*Daphnia magna*) EC50: 10 800 mg/L (24 h)

Persistence and Degradability: No data available.

Bioaccumulative Potential: No data available.

Mobility in Soil: No data available.

Other Adverse effects: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of waste in accordance with all applicable federal, state, and local regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: UN1170, Ethanol, Hazard Class 3, Packing Group II.

15. REGULATORY INFORMATION

U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Not regulated.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH: Yes.

CHRONIC HEALTH: Yes.

FIRE: Yes.

REACTIVE: No.

PRESSURE: No.

State Regulations:

California Proposition 65: Warning!

This product contains a chemical (ethanol) known to the state of California to cause cancer and reproductive/developmental effects.

U.S. TSCA Inventory: Ethanol is listed.

TSCA 12(b), Export Notification: Not listed.

Canadian Regulations:

WHMIS Information: Not provided for this material.

16. OTHER INFORMATION

Issue Date: 20 November 2013

Sources: ChemAdvisor, Inc., MSDS, *Ethyl Alcohol*, 11 September 2013.

Hazardous Substances Data Bank, National Library of Medicine, *Ethanol*, CAS# 64-17-5, Full Record, available at <http://toxnet.nlm.nih.gov/> (accessed Nov 2013).

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NRC	Nuclear Regulatory Commission
ALI	Annual Limit on Intake	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EC50	Effective Concentration, 50 %	RM	Reference Material
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transportation Agency	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
LC50	Lethal Concentration, 50%	STEL	Short Term Exposure Limit
LD50	Lethal Dose, 50 %	TLV	Threshold Limit Value
LEL	Lower Explosive Limit	TPQ	Threshold Planning Quantity
MSDS	Material Safety Data Sheet	TSCA	Toxic Substances Control Act
NFPA	National Fire Protection Association	TWA	Time Weighted Average
NIOSH	National Institute for Occupational Safety and Health	UEL	Upper Explosive Limit
NIST	National Institute of Standards and Technology	WHMIS	Workplace Hazardous Materials Information System

Disclaimer: Physical and chemical data contained in this SDS are provided only for use in assessing the hazardous nature of the material. The SDS was prepared carefully, using current references; however, NIST does not certify the data in the SDS. The certified values for this material are given in the NIST Certificate of Analysis.

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srmmsds@nist.gov; or via the Internet at <http://www.nist.gov/srm>.